CLAIMS

What is claimed is:

1. A method of splitting an image block, comprising:

setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks; and

setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks.

2. The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks is performed by referring to whether a macro block placed at the same location in a preceding image frame as the current macro block has been split.

3. The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks is performed by referring to whether a sub block placed at the same location in a preceding image frame as the current sub block has been split.

4. The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block in the operation of setting a plurality of splitting threshold values for the macro block in an image frame and determining whether to split the macro block into the sub blocks.

5. The method of claim 2, wherein the operation of setting a plurality of splitting

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threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

determining whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the macro block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block in the operation of setting a plurality of splitting threshold value for the macro block in the image frame and determining whether to split the macro block into the sub blocks.

6.   The method of claim 1, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks comprises:

determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block.

7.   The method of claim 3, wherein the operation of setting a plurality of splitting threshold values for each sub block and determining whether to split each sub block into smaller sub blocks comprises:

determining the possibility of splitting the sub block by determining whether the ratio of

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maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than the threshold value for determining the possibility of splitting the sub block.

8. The method of claim 4, wherein the operation of determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block;

determining whether the preceding macro block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

determining not to split the macro block if the preceding macro block has not been split, and determining to split the macro block if the preceding macro block has been split.

9. The method of claim 6, wherein the operation of determining whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block in the

operation of determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block comprises:

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block;

determining whether the preceding sub block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

determining not to split the sub block if the preceding sub block has not been split, and determining to split the sub block if the preceding sub block has been split.

10.   The method of claim 1, wherein the image frame is a binocular image frame representing a three dimensional image.

11.   The method of claim 2, wherein the image frame is a binocular image frame representing a three dimensional image.

12.   The method of claim 3, wherein the image frame is a binocular image frame representing a three dimensional image.

13.   The method of claim 1, wherein the operation of splitting is performed using quadtree disparity estimation.

14.   The method of claim 2, wherein the operation of splitting is performed using quadtree disparity estimation.

15.   The method of claim 3, wherein the operation of splitting is performed using quadtree disparity estimation.

16.   A method of splitting an image block, comprising:

setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block according to

whether a preceding macro block at the same location in a preceding image frame as the current macro block has been split; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks according to whether a preceding sub block at the same location in a preceding macro block as the current sub block has been split.

17.   The method of claim 16, wherein the operation of setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block according to whether a macro block at the same location in a preceding image frame as the current macro block has been split comprises:

determining the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value for determining whether to split the macro block;

determining whether the preceding macro block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

determining not to split the macro block if the preceding macro block has not been split, and determining to split the macro block if the preceding macro block has been split.

18.   The method of claim 16, wherein the operation of setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks according to whether a sub block at the same location in a preceding macro block as the current sub block has been split comprises:

determining the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block;

determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and a threshold value for determining whether to split the sub block;

determining whether the preceding sub block has been split if the ratio is between the two threshold values in the operation of determining whether the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

determining not to split the sub block if the preceding sub block has not been split, and determining to split the sub block if the preceding sub block has been split.

19. The method claim 16, wherein the image frame is a binocular image frame representing a three dimensional image.

20. The method claim 17, wherein the image frame is a binocular image frame representing a three dimensional image.

21. The method claim 18, wherein the image frame is a binocular image frame representing a three dimensional image.

22. The method of claim 16, wherein splitting is performed using quadtree disparity estimation.

23. The method of claim 17, wherein splitting is performed using quadtree disparity estimation.

24. The method of claim 18, wherein splitting is performed using quadtree disparity estimation.

25. A recording medium on which a method is written as a program code that can be read and executed on a computer, the program coded method comprising:

setting a plurality of splitting threshold values for a macro block in an image frame and determining whether to split the macro block into sub blocks; and

setting a splitting threshold value for each sub block and determining whether to split each sub block into smaller sub blocks.

26. A recording medium on which a method is written as a program code that can be read and executed on a computer, the the program coded method comprising:

setting a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determining whether to split the macro block according to whether a macro block at the same location in a preceding image frame as the current macro block has been split; and

setting a plurality of sub block splitting threshold values for splitting the sub block into smaller sub blocks and determining whether to split the sub block into smaller sub blocks according to whether a sub block at the same location in a preceding macro block as the current sub block has been split.

27. An apparatus to split an image block, comprising:

a macro block splitting determining unit that sets a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determines whether to split the macro block; and

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines whether to split the sub block.

28. The apparatus of claim 27, wherein the macro block splitting determining unit determines whether to split the macro block by referring to whether a macro block at the same location in a preceding image frame as the current macro block has been split.

29. The apparatus of claim 27, wherein the sub block splitting determining unit determines whether to split the sub block by referring to whether a sub block at the same location in a preceding macro block as the sub block has been split.

30. The apparatus of claim 27, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determining portion that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

a macro block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block, determines whether to split the macro block by comparing the threshold value for

determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another.

31.   The apparatus of claim 28, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determining portion that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of a sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block; and

a macro block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the macro block, determines whether to split the macro block by comparing the threshold value for determining the possibility of splitting the macro block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the macro block with one another.

32.   The apparatus of claim 27, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determining portion that determines the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

a sub block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block, determines whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and the threshold value for determining whether to split the sub block with one another.

33.   The apparatus of claim 29, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determining portion that determines the possibility of splitting the sub block by determining whether the ratio of maximum MAD to minimum MAD of the smaller sub block is greater than a threshold value for determining the possibility of splitting the sub block; and

a sub block splitting determining portion that, if the ratio of maximum MAD to minimum MAD is greater than the threshold value for determining the possibility of splitting the sub block, determines whether to split the sub block by comparing the threshold value for determining the possibility of splitting the sub block, the ratio of maximum MAD to minimum MAD, and a threshold value for determining whether to split the sub block with one another.

34.   The apparatus of claim 30, wherein the macro block splitting determining portion comprises:

a preceding macro block splitting determiner that determines whether the preceding macro block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and the threshold value for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block has not been split, and determines to split the macro block if the preceding macro block has been split.

35.   The apparatus of claim 32, wherein the sub block splitting determining portion comprises:

a preceding sub block splitting determiner that determines whether the preceding sub block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and the threshold value for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the preceding sub block has not been split, and determines to split the sub block if the preceding sub block has been split.

36.   The apparatus of claim 27, wherein the image frame is a binocular image frame representing a three dimensional image.

37.   The apparatus of claim 28, wherein the image frame is a binocular image frame representing a three dimensional image.

38.   The apparatus of claim 29, wherein the image frame is a binocular image frame

representing a three dimensional image.

39.   The apparatus of claim 27, wherein splitting is performed using quadtree disparity estimation.

40.   The apparatus of claim 28, wherein splitting is performed using quadtree disparity estimation.

41.   The apparatus of claim 29, wherein splitting is performed using quadtree disparity estimation.

42.   An apparatus to split an image block, which comprises:

a macro block splitting determining unit that sets a plurality of macro block splitting threshold values for splitting a macro block in an image frame into sub blocks and determines whether to split the macro block according to whether a macro block at the same location in a preceding image frame as the current macro block has been split; and

a sub block splitting determining unit that sets a plurality of sub block splitting threshold values for splitting each sub block into smaller sub blocks and determines whether to split each sub block according to whether a preceding sub block at the same location in the preceding macro block as the current sub block has been split.

43.   The apparatus of claim 42, wherein the macro block splitting determining unit comprises:

a macro block splitting possibility determiner that determines the possibility of splitting the macro block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the sub block in the macro block is greater than a threshold value for determining the possibility of splitting the macro block;

a preceding macro block splitting determiner that determines whether the preceding macro block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the macro block and a threshold value for determining whether to split the macro block; and

a macro block splitting final determiner that finally determines not to split the macro block if the preceding macro block has not been split, and determines to split the macro block if the preceding macro block has been split.

44.   The apparatus of claim 42, wherein the sub block splitting determining unit comprises:

a sub block splitting possibility determiner that determines the possibility of splitting the sub block by determining whether the ratio of maximum mean absolute difference (MAD) to minimum MAD of the smaller sub block in the macro block is greater than a threshold value for determining the possibility of splitting the sub block;

a preceding sub block splitting determiner that determines whether the preceding sub block has been split after determining that the ratio of maximum MAD to minimum MAD is between the threshold value for determining the possibility of splitting the sub block and a threshold value for determining whether to split the sub block; and

a sub block splitting final determiner that finally determines not to split the sub block if the preceding sub block has not been split, and determines to split the sub block if the preceding sub block has been split.

45.   The apparatus of claim 42, wherein the image frame is a binocular image frame representing a three dimensional image.

46.   The apparatus of claim 43, wherein the image frame is a binocular image frame representing a three dimensional image.

47.   The apparatus of claim 44, wherein the image frame is a binocular image frame representing a three dimensional image.

48.   The apparatus of claim 42, wherein splitting is performed using quadtree disparity estimation.

49.   The apparatus of claim 43, wherein splitting is performed using quadtree disparity estimation.

50.   The apparatus of claim 44, wherein splitting is performed using quadtree disparity estimation.

51.   A method of splitting an image block, comprising:

splitting macro image blocks each of left-eye views and right eye views into sub image blocks according to quadtree disparity estimation; and

splitting each sub block into smaller sub blocks.